

THREE NEW SPECIES OF *PHYLLANTHUS* (EUPHORBIACEAE: PHYLLANTHEAE) IN SOUTH AUSTRALIA

John T. Hunter & Jeremy J. Bruhl

Department of Botany, University of New England, Armidale, New South Wales 2351

Abstract

Three new species of *Phyllanthus* known to occur in South Australia are described and notes are presented on their distribution, ecology and conservation status: *Phyllanthus oblanceolatus*, *P. erwinii* and *P. striaticaulis*. *Phyllanthus oblanceolatus* is poorly known (3KC) and probably a rare plant with scattered occurrences across the Northern Territory, South Australia and New South Wales. *Phyllanthus erwinii* occurs in rocky localities across central and western arid Australia. *Phyllanthus striaticaulis* (distinct from *P. australis* Hook.f.) is restricted to the Fleurieu and Yorke Peninsulas and also to Kangaroo Island in South Australia. A key to all South Australian species of *Phyllanthus* is presented.

Introduction

The systematics of *Phyllanthus* within Australia has been in turmoil (see Eichler, 1965). Due to the small flowers and comparatively obscure nature of this group of plants, little has been done to clarify species boundaries and nomenclature on a continent-wide basis since Bentham (1873). Additionally, treatments by some authors, such as Airy Shaw (1980), have been overlooked or misread. This has led to inconsistencies in treatments across the country and to confusion as to the status of many species.

This paper presents full descriptions of the three new *Phyllanthus* taxa currently delimited within South Australia by the authors. A key to all South Australian species of *Phyllanthus* is presented, and notes are provided on species treated in South Australian floras that we consider do not occur in this state.

Subsequent papers dealing with new taxa and issues from other states and territories are being dealt with in other Australian herbarium journals. The current paper represents part of our treatment of Phyllanthaceae of Australia, towards a multi-authored study of the Euphorbiaceae for the *Flora of Australia* (due for completion about 1998).

Comprehensive aspects of affinities and issues of phylogeny are beyond the scope of this paper and we refrain from *ad hoc* discussions of such matters. They will be dealt with after further investigations, in subsequent papers.

The status of *P. saxosus* F. Muell., recorded from South Australia, is still under investigation and this species possibly represents part of a complex within *P. gunnii* Hook.f. Until further investigations are complete, the status of *P. saxosus* as a species has been retained in this paper.

Phyllanthus hirtellus Muell. Arg., although treated by Weber (1986), has not been included in this paper, as no collections have been found that indicate that this species occurs in South Australia.

Methods and Materials

Sampling and organisation of data

Significant proportions of the *Phyllanthus* specimens held by the herbaria AD, BRI, CANB, DNA, HO, MEL, NSW, PERTH and QRS, and historically important *Phyllanthus* specimens from A and GH were provisionally sorted into taxa. Close inspection of these taxa and subsequent re-sorting of specimens formed the basis for our decisions on the status

of these taxa. Ten representative specimens were chosen for detailed analysis of numeric characters. Other characters were scored in all available material. Selection of the ten specimens for study was based on specimen quality in terms of the amount and number of developmental stages displayed. Full variation in character states studied was included, for example, specimens with the longest and shortest leaves seen were scored.

A DELTA (Dallwitz, 1980; Dallwitz *et al.*, 1993) list of 395 characters and their states has been created by the authors for the Phyllanthaceae (Bruhl & Hunter unpublished). This was used to score attributes measured in selected specimens, together with those measured in all available material.

Fresh material was used where possible, but in most instances floral measurements were based on re-hydrated material. Mature leaves only were used for scoring leaf characters.

Terminology

For purposes of consistency across the members of the Phyllanthaceae, the perianth segments of *Phyllanthus* are referred to as sepals. Further developmental investigations need to be carried out to confirm this interpretation (Webster, 1993, pers. comm.).

Terminology for seed surface characters follows that of Stearn (1992). A bordered hilum is indicated by a discoloured and often raised region surrounding the hilum (best seen in *P. fuernrohrrii* F. Muell.; Fig. 1A, C). Phyllanthoid branching is indicated by a reduction of the leaf that subtends a branch to a scale-like structure (as illustrated by Webster, 1970), care should be taken where leaves may have fallen to check for a leaf scar which will always be present. The term 'prominulous' is as given by Stearn (1992).

Scanning electron microscopy

Seeds were sputter coated with gold using a Polaron E5100 and examined with a JOEL JSM-5800LV scanning electron microscope with a filament voltage of 15 kV.

Citation

Type specimens of all relevant taxa have been seen by one or both of the authors, unless there is an indication to the contrary (i.e. *n.v.*). Photographs of type specimens examined at BM and K are held at NE, together with photographs taken of type specimens on loan to NE.

Specimens are cited with collector and collector number. Where collector number is absent, date of collection is used. If both collector number and date are missing from the sheets the herbarium sheet number is given. Locality statements are direct quotations from labels and are unmodified.

A list of all specimens studied will be deposited at NE. An INTKEY dataset for interactive identification will be made available on completion of our study of the Australian Phyllanthaceae.

Taxonomy

Phyllanthus oblanceolatus* J.T. Hunter & J.J. Bruhl, *sp. nov.

Phyllanthus australis auctt. non Hook.: Moore, A Census of the Plants of New South Wales: 63 (1884); Moore & Betche, Handbook of the Flora of New South Wales: 74 (1893); Dixon, The Plants of New South Wales: 293 (1906); Maiden & Betche, A Census of New South Wales Plants: 121 (1916); Kalotas, Flora of Central Australia: 192 (1981); Weber, Flora of South Australia 2: 759 (1986) p.p.

Phyllanthus sp. aff. *lacunarius*: J.P. Jessop (ed.) J. Adelaide Bot. Gard. 12: 58 (1989) p.p.

Phyllanthus oblanceolatus, species nova similis *P. fuernrohri* F. Muell. a qua planta herbacea glabra, et sepalis et androecioque florum masculinorum minoribus differt.

Holotype: South Australia: Yathong Nature Reserve, 1.6 km north of Arkaroola Memorial gate, *Chinnock 326* (AD). (Upper specimen on sheet.)

Monoecious scandent herb, ca 15 cm high (from only one collection). *Branchlets* ellipsoid to flattened, 3–12.5 cm long, 0.3–0.7 mm wide, glabrous. *Stipules* persistent, free, 1.2–2.5 mm long, chartaceous, entire, glabrous, cream, yellow-brown to red-brown, narrowly triangular to triangular; bases truncate to rounded; apices acuminate to acute. *Leaves* alternate, distichous, jointed, brown when dry or remaining green; *petioles* 0.3–1.6 mm long, 0.2–0.6 mm wide, glabrous; *laminae* symmetrical, plane to concave, 8–19.5 mm long, 2.6–9.6 mm wide, elliptical, obovate to oblanceolate, mid-green, paler below, coriaceous, obscurely veined, glabrous with bases symmetrical, rounded to obtuse, with apices erect, ecaudate, acute, obtuse to rounded, mucronate, with margins plane. *Bracts* and bracteoles deciduous, glabrous. *Inflorescences* borne on persistent branches, at least sometimes with the sexes mixed, indeterminate, axillary, sessile. *Male flowers*: at least sometimes clustered, 1–4 per cluster; pedicels 0.8–5.5 mm long, glabrous; sepals 6, free, ascending to divergent, elliptical to ovate, 0.7–1.7 mm long, 0.4–1.2 mm wide, green and sometimes red tinged, obtuse to acute, chartaceous, glabrous; disk comprising discrete lenticular lobes, 0.6–1 mm wide, glabrous; stamens 3, 1-whorled, symmetrical, erect, filaments free, erect, terete, 0.2–0.6 mm long, anthers extrorse, erect, oblong to elliptical, 0.2–0.5 mm long, the locules parallel. *Female flowers*: at least sometimes clustered, 1–2 per cluster; pedicels jointed, at anthesis 1.1–5.2 mm long, in fruit 2.6–8.5 mm long, 0.1–0.4 mm wide, glabrous; sepals 6, lanceolate to ovate, at anthesis 1–2.7 mm long, in fruit 1.6–3.5 mm, 0.6–1.8 mm wide, free, ascending to divergent, green, with a distinct white margin, obtuse to acute, coriaceous, glabrous; disk crenate, 0.7–1.3 mm wide, glabrous; styles 3, free, variously divided, ascending, green, 0.2–0.7 mm long, 0.1–0.2 mm wide, narrow-terete, glabrous, with branches entire, linear; ovary 0.4–0.9 mm long, 0.5–1.1 mm wide, transversely ellipsoid and apically depressed, smooth, glabrous. *Fruit* a capsule, septicidal, transversely ellipsoid and apically depressed, 1.8–2.8 mm long, 2.5–4 mm wide, green, cartilaginous, glabrous, grooved septicidally; column persistent, angular-ovoid to obconical, 0.8–1.3 mm long. *Seeds* yellow-brown to red-brown and black with age, prismatic, laterally compressed, 1.7–2.1 mm long, 1.3–1.6 mm wide, smooth; hilum markedly depressed, distinctly bordered, circular to ovate, cavity basal. *Flowering*: January to December. *Fruiting*: January to December.

Distribution and ecology

Phyllanthus oblanceolatus has a patchy distribution across the Northern Territory, South Australia and Western New South Wales. In South Australia the species is known from the Gammon Ranges and the far north-western corner. It has also been found in the Macdonnell Ranges in the Northern Territory and the Barrier Range and Yathong near Cobar in New South Wales. Ecological information on herbarium specimens is scant, but collections have often been made along creek banks.

Conservation status: An initial coding of 3KC-NQS (Briggs & Leigh, 1988) is suggested.

Notes

There is only a handful of collections of *P. oblanceolatus*. This could be due to the inaccessibility of the places in which this plant is found. However, until further information is forthcoming this species should be considered rare. *Phyllanthus oblanceolatus* has been mislabelled as many different taxa including *P. australis* Hook. f. (see Weber, 1986 for discussion of the Mt Davies Camp specimen), *P. lacunarius* F. Muell., *P. sp. aff. lacunarius*, *P. lacunellus* Airy Shaw, *P. calycinus* Labill. and *Sauropus trachyspermus* (F.

Muell.) Airy Shaw. Morphologically *P. oblanceolatus* is similar to *P. fuernrohrii* F. Muell., but it is easily distinguished from *P. fuernrohrii* by being glabrous (Table 1).

The specific epithet of *P. oblanceolatus* alludes to the distinctly oblanceolate leaves which are common in this species.

Selected specimens

AUSTRALIA: NORTHERN TERRITORY: *Chippendale s.n.*, near Redbank Gorge, Macdonnell Ranges, 10.ix.1958 (DNA); *Weston 13327*, along river near EM-4 well, Mereenie oil lease, east end, (DNA).

SOUTH AUSTRALIA: *Chinnock 326*, Yathong Nature Reserve, 1.6 km north of Arkaroola Memorial gate, (AD); *Bushman 18*, Gammon Ranges National Park, (AD); *Eichler 19624*, Balcanoona, near Nudlamutana Well, (AD); *Cleland s.n.*, Mt Davies Camp, in the Tomkinson Range, 29.vi.1960 (AD); *Spooner 9467*, Bibliando Homestead, (AD); *Barker 496*, Artipena Springs (Martins Well Station), (AD).

NEW SOUTH WALES: *Canning 3653*, ca 2 m from Yathong Homestead towards Cobar, (CBG); *Irvine 1889*, Barrier Range, (MEL).

Table 1. Comparison of selected characters for *P. fuernrohrii* and *P. oblanceolatus*. Measurements in mm unless otherwise stated.

Character	<i>Phyllanthus fuernrohrii</i>	<i>Phyllanthus oblanceolatus</i>
Plants	glabrescent to indumented	glabrous
Lamina midrib	abaxially raised	flush
Plant height	0.15–1 m	ca 0.15 m
Branchlets	rounded ellipsoid	ellipsoid to flattened
Male flowers	1–7 per axil	1–4 per axil
Male sepal width	1.3–2.5	0.4–1.2
Male disc width	1–1.4	0.6–1
Female pedicel length at anthesis	0.5–3.2	1.1–5.2
Filaments	free to connate	free
Filament length	0.6–1.3	0.2–0.6
Style length	0.6–1.3	0.2–0.7

Phyllanthus erwinii J.T. Hunter & J.J. Bruhl, *sp. nov.*

Phyllanthus lacunarius F. Muell. var. *deuterocalyx* Gauba, Victorian Nat. 65: 184 (1948).

Type: Mt Squires, Barrow Range, W.A., *R. Helms*, 23.9.1891 (holo: MEL).

Phyllanthus lacunarius auctt. non F. Muell.: Kalotas in J. Jessop (ed.) Flora of Central Australia: 191 (1981); Lazarides & Hince, CSIRO Handbook of Economic Plants of Australia: 188 (1993); Henderson & Forster, Queensland Vascular Plants: Names and Distributions: 115 (1993); Latz, Bushfires and Bushtucker: 244 (1995) p.p.

Phyllanthus lacunellus auctt. non Airy Shaw: Airy Shaw, Kew Bull. 35: 387 (1981); Green, Census of the Vascular Plants of Western Australia edn 2: 108 (1985) p.p.

Phyllanthus erwinio, species nova similis *P. lacunello* Airy Shaw a qua foliis apice rotundato, et ramulis ovariis et fructibus laevibus differt.

Holotype: Northern Territory: Elkedra Station, jump up, 32 km towards Hatches Creek, prostrate herb on recently burned rocky country, *Henshall 2744*, 10.viii.1979 (DNA). (Upper specimen on sheet.)

Monoecious perennial herb, 0.05–0.2 m tall. *Branchlets* rounded, 3.5–9 cm long, 0.4–0.8 mm wide, glabrous or scabrous in longitudinal rows up the stem. *Stipules* persistent, free, 0.9–2.7 mm long, membranous, with a distinct white margin, entire, glabrous, cream to yellow-brown, narrowly triangular; bases truncate to rounded; apices acuminate. *Leaves* alternate, distichous, jointed, brown when dry or remaining green; *petioles* 0.5–1.5 mm

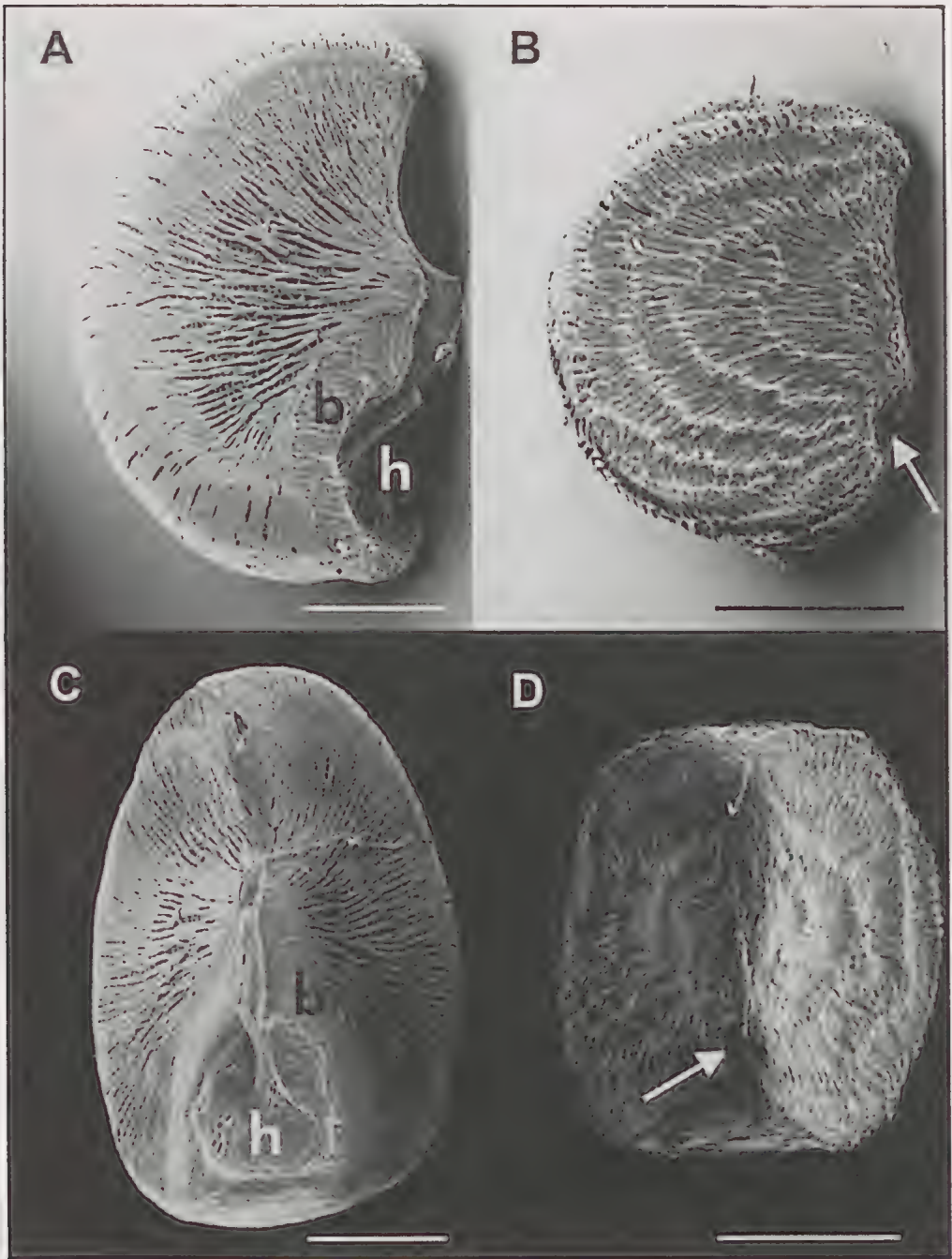


Fig. 1. Scanning electron micrographs of seeds of *Phyllanthus*. A, C, *P. fuernrohrii* F. Muell., the hilum (h) is markedly depressed and distinctly bordered (b); B, D, *P. erwinii* J.T. Hunter & J.J. Bruhl., the hilum (arrows) is slightly depressed. Scale bars = 0.5 mm. (A, C from Jackson 2773 AD; B, D from Henshall 2744 DNA).

long, 0.2–0.4 mm wide, glabrous; *laminae* symmetrical, plane to concave, 7.1–23.5 mm long, 2.7–6 mm wide, obovate to oblanceolate, grey-green, sub-coriaceous, abaxially minutely papillate or smooth, occasionally glabrous, more commonly scabrous, abaxially and on the margins, bases symmetrical, cuneate to attenuate, apices erect, ecaudate, rounded, mucronate, with margins plane; midrib abaxially raised with 3–4 veins on either side when identifiable. *Bracts* and bracteoles deciduous, glabrous. *Inflorescences* borne on persistent branches, the sexes mixed, indeterminate, axillary, sessile. *Male flowers*: at least sometimes clustered, 1–3 per cluster; pedicels 0.6–1.4 mm long, glabrous; sepals 6, free, ascending to incurved, ovate to obovate, 0.6–1.4 mm long, 0.5–0.9 mm wide, white, sometimes tinged red, elliptical to circular, truncate to acute, membranous to chartaceous, glabrous; disk comprising discrete lenticular lobes, 0.4–0.7 mm wide, glabrous; stamens 3, 1-whorled, symmetrical, declinate, with filaments free, erect, terete, 0.1–0.3 mm long, with anthers extrorse, ascending, oblong, 0.1–0.3 mm long, anther locules parallel. *Female flowers*: only solitary; pedicels jointed, at anthesis 0.3–0.8 mm long, 0.1–0.2 mm wide, in fruit 0.8–2 mm long, 0.2–0.3 mm wide, glabrous; sepals 6, 0.5–2.4 mm long, 0.2–0.9 mm wide, elliptical, lanceolate to ovate, at anthesis ascending to divergent, in fruit divergent to reflexed, white, green or yellow, obtuse to acute, coriaceous, glabrous; disk crenate, 0.4–0.9 mm wide, glabrous; styles 3, free, divided for about half or much more of their length, divergent, white sometimes tinged pink, 0.1–0.5 mm long, 0.1–0.2 mm wide, linear, glabrous, branches entire, linear; ovary 0.3–0.6 mm long, 0.4–1 mm wide, transversely ellipsoid, apically depressed, verrucose, glabrous. *Fruit* a capsule, septicial, transversely ellipsoid apically depressed, 1.2–1.6 mm long, 2.4–3.2 mm wide, green turning grey with age, cartilaginous, verrucose, glabrous, grooved septicially; column persistent, conical to broadly barrel shaped, 0.3–0.7 mm long. *Seeds* yellow-brown, red, pallid-brown to red-brown, prismatic, laterally compressed, 1–1.3 mm long, 0.9–1.3 mm wide, prominently rugose; hilum slightly depressed (Fig. 1B, D), circular, cavity basal. *Flowering*: April to October. *Fruiting*: April to October.

Distribution and ecology

Phyllanthus erwinii has a widespread and disjunct occurrence across western and central arid Australia, from Shark Bay and Derby in Western Australia through the Northern Territory and just over the border into South Australia. This species has been found in grassy woodlands, arid shrublands and tussock grasslands in central Australia on rocky ground along ephemeral watercourses in sandy and clayey soils. Few collections have been made of this species, but this probably reflects the remoteness of locations from which it has been found.

Notes

Phyllanthus erwinii is similar to, but morphologically and geographically distinct from *P. lacunarius* and *P. lacunellus* (Table 2). Gauba (1948) described *P. erwinii* as *P. lacunarius* var. *deuterocalyx*. Airy Shaw (1980) subsequently included this entity within *P. lacunellus*. With the proper circumscription of *P. lacunellus* and the recognition of *P. erwinii*, *P. lacunarius* now becomes uncommon and probably rare in South Australia.

Most specimens of what we recognise as *P. erwinii* have been identified as *P. lacunellus*, while specimens of *P. lacunellus sensu stricto* either have been left undetermined or misidentified as *P. lacunarius*. For discussion of *P. lacunellus* and *P. lacunarius* see Airy Shaw (1981).

The specific epithet commemorates Erwin Gauba, Australian botanist (1891–1964), who first recognised this entity at the rank of variety.

Selected specimens

WESTERN AUSTRALIA: *Newbey 10715*, 22 km SE of Quarry Hill, ca 105 km of Tom Price, (PERTH); *Cranfield 5358*, No. 4 Well, Erong Springs Station, (PERTH); *Meadly 134*, Manberry Stn, NE of Carnarvon, (PERTH); *George 8288*, Pass of the Abencerrages, Rawlinson Range, (PERTH); *Anon.*, Greenoughs River, xi.1877, (MEL); *Gaubá 1941* (PERTH).

NORTHERN TERRITORY: *Henshall 2744*, Elkedra Stn, jump up 32 km towards Hatches Creek, (DNA); *Latz 4887*, Simpsons Gap National Park, (DNA); *Latz 8798*, Gully above Reedy Rock Hole, (DNA); *Latz 8825*, 1 km west of Reedy Rockhole, (DNA).

SOUTH AUSTRALIA: *Kuchel 368*, Gorge on north-east of Mt Woodroffe in Musgrave Ranges, (AD 01639153).

Table 2. Comparison of selected characters for *P. lacunarius*, *P. lacunellus* and *P. erwinii*.

Character	<i>Phyllanthus lacunarius</i>	<i>Phyllanthus lacunellus</i>	<i>Phyllanthus erwinii</i>
Plant height	ca 0.3 m	0.4–0.6 m	0.05–0.2 m
Branchlets	ellipsoid to flattened, not ribbed	rounded, ribbed	rounded, not ribbed
Branching	phyllanthoid	not phyllanthoid	not phyllanthoid
Lamina apex	rounded	obcordate to emarginate	rounded
Flower number	1–2 per axil	1–2 per axil	1 per axil
Sepal margin	distinct and white	distinct and white	indistinct
Ovary & fruit	smooth	smooth	verrucose
Seed sculpture	striate	rugose to ribbed	rugose
Extra-hilum lateral depression	not present	present	not present

Phyllanthus striaticaulis J.T. Hunter & J.J. Bruhl, *sp. nov.*

Phyllanthus australis auctt. non Hook.: Tate, A Handbook of the Flora of Extratropical South Australia: 40 (1890); Black, Flora of South Australia 2: 511 (1963); Weber, Flora of South Australia 2: 759 (1986).

Phyllanthus striaticaulis, species nova similis *P. australe* Hook. f. a qua floribus albis usque viridibus, pedicellis longioribus, et fructibus angustioribus differt.

Holotype: South Australia: Kangaroo Island, near American River (Town) at the road to Kingscote, 13.xi.1958, *Eichler 15481* (holo [male, right specimen on sheet]: AD; iso: AAU *n.v.*, CANB, E *n.v.*, GH *n.v.*).

Dioecious perennial herb, 0.05–0.6 m tall. *Branchlets* persistent, rounded to angular, prominently ribbed, 6–27 cm long, 0.04–1.4 mm wide, glabrous to papillose. *Stipules* persistent, free, 0.5–1.1 mm long, red-brown or black, membranous, entire to erose, glabrous, ovate, base truncate to cordate, apex acuminate to acute. *Leaves* alternate, distichous, jointed; *petioles* 0.5–1.1 mm long, 0.3–0.6 mm wide, glabrous; *laminae* symmetrical, concave, 6.3–12.5 mm long, 1.9–4.2 mm wide, elliptical, lanceolate, obovate to oblanceolate, light-green to mid-green, sub-coriaceous, obscurely veined, glabrous or papillose, with bases symmetrical, obtuse and attenuate, with apices erect to recurved, ecaudate, acute to rounded, mucronate, often reddish, sometimes becoming callused, margins plane, thickened; midrib and lateral veins abaxially raised. *Bracts* and bracteoles deciduous, glabrous. *Inflorescences* borne on persistent branches, indeterminate, axillary, sessile. *Male flowers* at least sometimes clustered, 1–4 per cluster; pedicels 1.8–6.9 mm long, glabrous; sepals 6, free, ascending to divergent, ovate to obovate, 1.2–2.2 mm long, sepals 0.8–1.4 mm wide, white or green, elliptical, oblong, rounded to acute, sepals membranous to chartaceous, glabrous; disk comprising discrete lobes, 0.9–1.7 mm wide, glabrous, lobes lenticular; stamens 3, 1-whorled, symmetrical, erect to declinate; with filaments free, erect, terete, 0.4–0.8 mm long; with anthers extrorse, ascending, oblong, 0.2–0.4 mm long, anther locules parallel. *Female flowers* at least sometimes clustered, 1–2

per cluster; pedicels jointed, at anthesis 2–5.2 mm long, 0.1–0.3 mm wide, in fruit 3–5.8 mm long, 0.3–0.5 mm wide, \pm distally dilated, glabrous; sepals 6, 1–2.3 mm long, 0.7–1.7 mm wide, elliptical, circular, to ovate; disk crenate, 1–2.1 mm wide, glabrous, free, at anthesis erect to ascending, in fruit divergent, white or green, with a distinct white margin, rounded to acute, coriaceous, glabrous; styles 3, free, divided for about half their length or less, divergent, white, yellow, to green, 0.4–1 mm long, 0.2–0.4 mm wide, narrow-terete, glabrous, branches entire, linear; ovary 0.3–0.8 mm long, 0.8–1.2 mm wide, transversely ellipsoid and apically depressed, smooth. Fruit a capsule, septicidal, transversely ellipsoid and apically depressed, sometimes with observable venation, 2–2.4 mm long, 2.4–3.8 mm wide, green, cartilaginous, smooth, glabrous, grooved septicidally; column persistent, narrow oblong, 0.9–1.2 mm long. Seeds prismatic, laterally compressed, 1.5–1.9 mm long, 1.2–1.5 mm wide, prominently scalariform to reticulate, occasionally striate yellow-brown to red-brown; hilum slightly depressed, ovate, cavity basal. *Flowering*: June to February. *Fruiting*: July to February.

Distribution and ecology

Phyllanthus striaticaulis is restricted to Kangaroo Island and the Fleurieu and Yorke Peninsulas within South Australia. It has been found in dry sclerophyll forest, grassy woodland and in coastal heaths.

Notes

This species is morphologically very close to *P. australis* Hook. f. Nevertheless, *P. striaticaulis* is easily distinguished from *P. australis* by its strongly ribbed branchlets, white, green or yellowish male flowers, and habit (Table 3). For illustrations of *P. striaticaulis* (as *P. australis*) see Weber (1986). The recognition of *P. striaticaulis* now excludes *P. australis* from South Australia, the latter is confined to Tasmania and Victoria.

The specimen selected as the type is male. This provides maximum utility given the diagnostic features of the new species.

The specific epithet alludes to the noticeable ribbing on the branchlets.

Selected specimens

SOUTH AUSTRALIA: *Tepper s.n.*, Mount Lofty Range, Clarendon xi.1883 (AD); *Ising s.n.*, Waitpinga, Encounter Bay, 16.viii.1957 (AD); *Spooner 6059*, near Arthur Hill, overlooking Tunkalilla Creek, (AD); *Eichler 15481*, near American River at road to Kingscote, (AD); *Spooner 7990*, Lubra Creek about 1 km behind Antechamber Bay, (AD); *Bates 3504*, Port Vincent, ca 35 km North North East of Edithburgh, (AD); *Hall 59*, Cut line road, between Stansbury and Hardwicke Bay, (AD); *Spooner 6130*, Minlaton scrub, (AD); *Brown s.n.*, Yorke Peninsula, 1.xi.1978 (AD); *Blaylock 700*, Hundred of Curramulka, section 141, (AD).

Table 3. Comparison of selected characters for *P. australis* and *P. striaticaulis*. Measurements in mm.

Character	<i>Phyllanthus australis</i>	<i>Phyllanthus striaticaulis</i>
Habit	weeping	spreading to erect
Branchlets	smooth	ribbed and angled
Laminae	plane	concave
Veins	abaxially not raised	abaxially raised
Male sepal colour	red	white, green or yellowish
Male pedicel length	1.2–2.5	1.8–6.9
Female pedicel length	1–3	2–5.8
Fruit width	3.7–4	2.4–3.8
Leaf apex	commonly apiculate and turning black	acute and mucronate rarely apiculate or discolourous

Table 4. Occurrence of *Phyllanthus* species in botanical regions of South Australia. +, present; NW, North-western; LE, Lake Eyre; NU, Nullarbor; GT, Gairdner-Torrens; FR, Flinders Ranges; EA, Eastern; EP, Eyre Peninsula; NL, Northern Lofty; MU, Murray; YP, Yorke Peninsula; SL, Southern Lofty; KI, Kangaroo Island; SE, South-eastern. Botanical regions follow Jessop and Toelken (1986).

Species	NW	LE	NU	GT	FR	EA	EP	NL	MU	YP	SL	KI	SE
<i>P. calycinus</i>							+			+	+		
<i>P. erwinii</i>	+												
<i>P. fuernrohrii</i>		+	+	+	+	+	+		+				
<i>P. lacunarius</i>		+							+				
<i>P. lacunellus</i>		+		+	+	+	+		+				
<i>P. maderaspatensis</i>		+			+								
<i>P. oblanceolatus</i>	+				+	+							
<i>P. saxosus</i>				+	+	+	+	+	+		+	+	+
<i>P. striaticaulis</i>										+	+	+	

Key to the South Australian species of *Phyllanthus*

- 1 Branch leaves reduced to scales (phyllanthoid branching present) *P. lacunarius*
- 1: Branch leaves laminate (phyllanthoid branching absent) 2
- 2 Female sepals in fruit 3.5–8 mm long and 2.6–7.3 mm wide; fruit 3–5.2 mm long and 5–6.6 mm wide; seeds 2.5–3.9 mm long and 1.8–2.5 mm wide; male pedicels 4.2–9.5 mm long; male sepals 1.2–4 mm long; male disk 0.9–2.5 mm wide *P. calycinus*
- 2: Female sepals in fruit 0.5–3.5 mm long and 0.2–2.6 mm wide; fruit 1.2–3 mm long and 1.9–5 mm wide; seeds 0.9–2.3 mm long and 0.8–1.8 mm wide; male pedicels 0.3–6.9 mm long; male sepals 0.4–2.5 mm long; male disk 0.9–1.7 mm wide 3
- 3 Plants dioecious 4
- 3: Plants monoecious 5
- 4 Branchlets ribbed; stipule apex acuminate to acute; leaves 1.9–4.2 mm wide, margins thickened; anthers 0.2–0.9 mm long; styles 0.4–1 mm long; fruit 2–2.4 mm long, 2.4–3.8 mm wide; seed 1.5–1.9 mm long, scalariform to reticulate *P. striaticaulis*
- 4: Branchlets not ribbed; stipule apex rounded to obtuse; leaves 1.5–16.5 mm wide, margins not thickened; anthers 0.7–1 mm long; styles 1.2–2.4 mm long; fruit 2.6–3 mm long, 4.2–4.7 mm wide; seed 2.1–2.3 mm long, striate *P. saxosus*
- 5 Male pedicels 0.8–5.5 mm long, glabrous to indumented; male sepals 0.7–2.5 mm long; female pedicels at anthesis 0.5–5.2 mm long, in fruit 2.4–8.5 mm long; fruit 1.8–3 mm long; seeds 1.7–2.5 mm long 6
- 5: Male pedicels 0.2–1.4 mm long, only ever glabrous; male sepals 0.5–1.7 mm long; female pedicels at anthesis 0.3–1.4 mm long, in fruit 0.8–2.6 mm long; fruit 1.2–2 mm long; seed 1–1.6 mm long 7
- 6 Hairy shrub; branchlets rounded to ellipsoid; stipules 0.8–3.2 mm long; male sepals 1.3–2.5 mm long; male disk 1–1.4 mm wide; female disk 1.1–1.9 mm long; anther filaments 0.6–1.3 mm long; styles 0.6–1.3 mm long *P. fuernrohrii*
- 6: Herb or small shrub, glabrous; branchlets flattened to ellipsoid; stipules 1.2–2.5 mm long; male sepals 0.7–1.7 mm long; male disk 0.6–1 mm wide; female disk 0.7–1.3 mm wide; anther filaments 0.2–0.6 mm long; styles 0.2–0.7 mm long *P. oblanceolatus*
- 7 Leaves paler abaxially; veins distinctly prominulous abaxially; anther filaments connate; anthers elliptical to circular; styles merely notched; seeds colliculose *P. maderaspatensis*
- 7: Leaves similar on both surfaces; veins not distinctly prominulous; anther filaments free; anthers oblong; styles variously divided; seeds rugose to ribbed 8
- 8 Branchlets ribbed; lamina apices obcordate to emarginate; leaves papillate; female sepals with a distinct white margin; ovary and fruit verrucate *P. lacunellus*
- 8: Branchlets not ribbed; lamina apices rounded; leaves scabrous; female sepals without a white margin; ovary and fruit smooth *P. erwinii*

Acknowledgements

The authors thank the heads of the following herbaria for the loan of specimens: A, AD, BM, BRI, CANB, CBG, DAV, DNA, GH, HO, K, MEL, NSW, PERTH, QRS. We are grateful to the heads of BM and K for the gift of photographs of type specimens. Thanks also to the heads of A, BM, BRI, CANB, CBG, DNA, G, GH, K, LINN, MAREEBA, MEL, NSW, QRS for access to facilities and specimens; Clyde Dunlop and Judy Egan for assistance with field work; Grady Webster for helpful comments during the project; Bill Barker and Frances Quinn for constructive comments on the manuscript; Lyn Craven and Frances Quinn for the Latin descriptions; Karen Painter for scanning electron microscopy; the director of the Australian National Parks Service and the state equivalents in New South Wales, Northern Territory, Queensland, and South Australia for permission to collect in service areas; and the Research School of Biological Sciences (ANU) for financial support to J.J. Bruhl for visits to G, K and LINN. This project was supported by funding from Australian Biological Resources Study.

References

- Airy Shaw, H.K. (1981). Notes on Euphorbiaceae from Indomalaysia, Australia and the Pacific. *Kew Bull.* 35: 383–399.
- Barker, W.R. (1989). Euphorbiaceae. in J.P. Jessop (ed.). A list of vascular plants of South Australia. Edition III. *J. Adelaide Bot. Gard.* 12: 1–163.
- Bentham, G. (1873). *Flora Australiensis* vol. 6. (L. Reeve: London).
- Briggs, J.D. & Leigh, J.H. (1988). *Rare or Threatened Australian Plants*. (Australian National Parks and Wildlife Service: Canberra).
- Dallwitz, M.J. (1980). A general system for coding taxonomic descriptions. *Taxon* 29: 41–46.
- Dallwitz, M.J., Paine, T.A., and Zurcher, E.J. (1993). *User's guide to the DELTA system*. (Division of Entomology, CSIRO: Canberra).
- Eichler, H. (1965). *Supplement to J.M. Black's Flora of South Australia* ed. 2 (Gov. Printer: Adelaide).
- Gauga, E. (1948). Contributions to the flora of South Australia – III. *Victorian Nat.* 65: 183–186.
- Jessop, J.P., and Toelken, H.R. (1986) (eds). *Flora of South Australia*. Part I. Lycopodiaceae–Rosaceae. edn 4 vol 1. (Gov. Printer: Adelaide).
- Stearn, W.T. (1992). *Botanical Latin*. edn 4 (David & Charles: Melksham).
- Weber, J.Z. (1986). Euphorbiaceae. in J.P. Jessop & H.R. Toelken (eds) *Flora of South Australia*. Part II. pp.735–768 (Gov. Printer: Adelaide).
- Webster, G.L. (1970). A revision of *Phyllanthus* (Euphorbiaceae) in the continental United States. *Brittonia* 22: 44–76.